

USAWC STRATEGY RESEARCH PROJECT

**OPERATIONAL ART AND THE INCIDENT COMMAND SYSTEM:
PUBLIC HEALTH'S BRIDGE IN BIOTERRORISM PREPAREDNESS AND RESPONSE**

by

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ABSTRACT

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Homeland Security Presidential Directive 5 (28 February 2003) calls for a National Incident Management System (NIMS) to provide a consistent nationwide approach for federal, state, and local governments in preparedness for, response to, and recovery from domestic incidents. The Incident Command System (ICS) is nationally recognized as the platform of choice for unification of operations in emergency response. Although ICS is a well-known entity in traditional first responder circles such as fire and law enforcement, the first responders in an event involving bioterrorism would be public health providers along with hospital and community healthcare personnel (non-traditional first responders). The national public health system has the healthcare expertise related to biological agents, but it lacks the ability to take command and control of consequence management operations. Public health has a lack of understanding of ICS beyond familiarization, an established leadership style involving consensus building and group decision-making, and an unproven track record in leading mass casualty response teams. This SRP recommends the development of a nationwide system of ICS training and application for public health personnel, to include exercise scenarios and simulations built on ICS unified command. The national ICS model would incorporate the existing FEMA model, but would allow for unique health care issues such as epidemiologic surveillance and investigation, patient cohorting for isolation, and lab operations. Selected personnel would be trained in military concepts of command and control (C2) and operational art to include campaign planning and principles of war. The ICS platform can enable the public health system to respond to public health emergencies in a timely and successful manner, whether the crises are manmade or natural biological outbreaks. Public health personnel must be able to take command and control the situation, preventing additional cases of infectious disease and saving lives during a mass casualty incident. In addition, cross-cultural training in military concepts to accomplish ICS functions could provide a bridge between the military and civilian sectors for future response partnerships.

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PREFACE

This paper began as a document to investigate bridging health care resources between military and civilian sectors for bioterrorism response. In reality, though, the response at the civilian level is a local and regional issue for the health care sector, with the existing Military Assistance to Civilian Authorities (MACA) and DOD assets in a supporting role (albeit needing some strong tweaks). The military has something else to share, something in addition to its limited medical personnel and equipment: expertise in running a unified operation to include operational art, principles of war, campaign planning, and command and control (C2). Who else can offer better advice?

That decided, this paper could have gone on to address joint command issues and drawn in partner agencies outside the health care arena--certainly a worthy topic. The integration of health care resources and other emergency responders is a current issue of concern. As any combat soldier knows, though, one has to crawl, walk, and then run. Public health personnel, certainly with the clinical knowledge to lead in the consequence management following a biological incident, needs to learn aspects of operational art and C2 in their own lane (i.e., health systems response) prior to including others in the mix.

I would like to thank MG Donna Barbisch for a sunny afternoon at a picnic table by the East Potomac, where she shared insights about Army strengths and growth potentials for bioterrorism response in the civilian sector. She originally planted the idea that the military's strengths may not be in physical resources, but in ways of organizing operations.

My appreciation goes out to COL Wayne D. Foxworth, my SRP advisor, for listening to multiple iterations of outlines and reading several drafts, always providing insightful guidance and clarifying questions from the corridors in Root Hall at Carlisle Barracks. I also thank Professor Jim Hanlon for combing through this study in a continuing quest for grammatical correctness and simplicity in communication.

My co-workers, Mr. Santosh Kumar and Mr. Robert (Fire Bob) Rhoades, Emergency Response Coordinators at the Ohio Department of Health (ODH), first cued me in to the importance of the Incident Command System. They took me by the hand and introduced me to ICS, never letting me forget that "first thing, we need to get them [our public health partners] to understand ICS!" They did this throughout my stay in the Disaster Planning and Response Program. My gratitude is also conveyed to my civilian supervisor, Mr. Steven Wagner, who enabled me to take the months required for War College AY '03 away from my position at ODH and encouraged me to fly. He then advised me as to ICS updates and ongoing issues at the agency.

My hope is that public health will very soon have a nationally integrated and unified ICS response, one that they can proficiently command, for use in disaster exercises, day-to-day activities that stress resources, and the occasional natural disaster. My prayer is that the public health infrastructure will never need to use such a platform in the consequence management of bioterrorism and associated mass casualties.

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OPERATIONAL ART AND THE INCIDENT COMMAND SYSTEM: PUBLIC HEALTH'S BRIDGE IN BIOTERRORISM PREPAREDNESS AND RESPONSE

I think the necessity of being ready increases. Look to it.

—Abraham Lincoln

Outbreaks of human anthrax in October 2001 heightened concerns regarding health care preparedness for bioterrorism response. Most of the worry seemed to focus on hospital preparedness—mostly on whether hospitals have enough surge capacity for a mass casualty response. To this date, the majority of media coverage focuses on questions regarding the nation's ability to coordinate an effective response through consequence management activities in the hospitals and clinical health care sector. Indeed, multitudes of infected individuals and the worried-well are likely to be knocking on health care facility doors after a biological agent release. There is a more compelling question in preparedness and response to a biological incident: Is the public health system in this country ready? Although hospitals are key partners in bioterrorism response, the public health system's ability to command and control consequence management operations for infectious and communicable disease is the question of the hour.

Almost a hundred years ago, the nation's public health system was not ready for such a challenge. The global Spanish influenza outbreak in 1918 turned this country's public health system on its head by the end of the epidemic—600,000 American deaths later. Around the world over 12,500,000 deaths were attributed to the pandemic. When this epidemic struck towards the end of World War I, health care facilities were overwhelmed. The existing public health system, mostly operating at the township, village, and small town level apart from the major cities, was found lacking. Mayors took over quarantine functions, military troops took over burial arrangements, and relatives and orphanages took over those left behind. Public health did not take over much because it was not organized to accomplish such operations in most areas of the nation. Is the public health system of the 21st century be any better prepared to command and control a similar mass casualty public health emergency?

In the late 1980s, the Institute of Medicine (IOM) called the very future of public health into question in a landmark study. *The Future of Public Health* warned America of the weakened state of the public health infrastructure, as well as its current inability to act decisively or swiftly.¹ The "core functions" of public health--assessment, policy development, and assurance of the population's health--were closely examined. The IOM study found that, while there was much

value and importance in national public health efforts, the capacity of the nation's public agencies to fulfill core functions was seriously lacking. The public health system was in "disarray." Most disturbing was the country's naïve belief that epidemics of communicable disease were a thing of the past, with significant death and destruction via infectious disease forever defeated in our homeland.² The landmark report and its strong recommendations sounded the first wake-up call for strengthening public health since the 1918 influenza. The 1980s health care community complacently glowed in the successes of heroic, high tech interventions for tertiary prevention (i.e., fixing what is already broke). Following closely after the release of *The Future of Public Health*, emerging disease patterns (naturally occurring trends including antimicrobial resistance) and the bioterrorism threat succeeded in sounding further alarms to strengthen the public health system.

The nation's initiation into bioterrorism by anthrax on 4 October 2001 passed without inflicting huge casualties. This was probably due to the unreliable delivery mechanism: single envelopes in the postal system. However, the incident certainly confirmed that the initial detection of a covert biological or chemical attack would most likely occur at the local level. It also decidedly revealed the need for public health surveillance systems at the ready to detect unusual patterns of disease and injury, including those caused by obscure or unknown agents. Public health providers historically operate within state and local health departments and a handful of national agencies (e.g., Centers for Disease Control and Prevention). The traditional public health system already incorporates the expertise to address threats of bioterrorism: the expertise of population health practice combined with foundational scientific knowledge in epidemiology. Although the government certainly has a "unique responsibility for promoting and protecting the health of the people, built on a constitutional, theoretical, and practical foundation," this under-resourced sector (i.e., less than 3% of the health care dollar) has been struggling for years to shoulder the bulk of the burden of the public's health.³

What to do, then? Another in-depth, contracted study is not needed in public health's case. The public health system must secure more resources and get smarter about the ones that are already available. More resources *have* been directed at the public health system in the past year. Over \$900 million dollars, earmarked for bioterrorism preparedness, will provide a good start for bolstering local public health infrastructure.⁴ In fact, any resource increase in the starved but frugal system will enhance the foundational public health practices that also address bioterrorism preparedness.

As for getting smarter about available resources on-hand, the answer in disaster preparedness and response is the Incident Command System—ICS. This system was initiated

in the 1970s in response to a series of major wildfires in Southern California that occurred across jurisdictions of control and exhausted the existing resources of the those jurisdictions. In reality, though, the origins of ICS can also be traced to military command and control structure. ICS is now used by the fire service community for day-to-day application as well as use in major incidents. During the last decade of the 20th century, other emergency preparedness agencies increasingly used ICS for emergency response for both planned events and disaster incidents.

Public health is the latest player at the ICS table, trying to find its way through command and control of operations that are theirs to lead by right of expertise. However, the public health system is not fully capable of leading an ICS operation. Public health leaders are steeped in leadership theory and group dynamics; theirs is a world of consensus building and team-thinking. This inclusive and deliberative management style tends to put public health personnel at odds with partners who deftly use ICS in rapidly progressing events and emergencies. The danger inherent in a situation involving bioterrorism is that of public health expertise left behind as others leap ahead to take action, any action, in the evolving situation.

This study argues that public health personnel in the local, state, and national system must lean forward in the battle against bioterrorism through consequence management. Public health's knowledge of infectious and communicable disease interventions, combined with its current and future abilities for disease surveillance and epidemiological action, warrant its key role in competent bioterrorism preparedness and response. Expertise alone, though, will not guarantee public health competency in consequence management during a bioterrorism event. For the rapid and decisive operations needed in mass casualty response, the public health system must learn how to proficiently implement ICS: first within their own system, then with their health care partners, and finally in conjunction with joint operations involving non-healthcare agencies. To lead the way in bioterrorism consequence management, public health leaders must be able to exercise command and control while conducting operations dependent on their highly specialized knowledge. This study's recommendations seek to assure that this nation's public health personnel at all levels across the nation are trained and unified in command and control and operational art. Public health leaders can ultimately launch rapid and decisive operations for consequence management only by becoming adept proponents and practitioners of the disaster response command and control mechanism: the Incident Command System.

DECLARING WAR ON BIOTERRORISM – CONSEQUENCE MANAGEMENT OF INFECTIOUS AND COMMUNICABLE DISEASES

As directed by a 1995 Presidential Decision Directive (PDD) to manage full-scale disasters, there are two approached—crisis management and consequence management.⁵ Crisis management is primarily a law enforcement function; it includes measures to identify and secure the resources needed to prevent or resolve a terrorist act. A crisis management response includes intelligence gathering, surveillance, tactical operations, forensics, and criminal investigations. The Federal Bureau of Investigation is the lead agency for crisis management in terrorism response. Consequence Management is an emergency response function and includes measures to protect public health and safety, restore essential government services, and provide emergency relief to governments, businesses, and individuals affected by acts of terrorism.⁶ The Federal Emergency Management Agency (FEMA) is the lead agency for consequence management. Although designated as lead agencies, both are quite reliant on local and state resources to accomplish their crisis and consequence management missions. A well-known truth is sagely repeated in disaster training: “All disasters are local events.”

Although inclusion of public health in local and state annexes for bioterrorism response has improved in the last several years, traditional first responders (e.g., fire, law enforcement, and HAZMAT) and local officials need to learn more about the public health leadership role and its expertise in bioterrorism preparedness. For purposes of this study (written as an Army War College requirement), public health operations are presented in terms of battlefield strategy in this section. Consequence management of bioterrorism involves warfighting techniques. Its activities can be usefully categorized into ends, ways, and means.

Epidemiology is “the study of the distribution and determinants of diseases and injuries in human populations.”⁷ Epidemiology (or “epi”) is the foundational science of public health; it provides the doctrine that determines ultimate strategy in the war on disease. Epi doctrine should be applied to responses to bioterrorism events. Public health professionals have a thorough knowledge of infectious disease; this knowledge is essential in consequence management operations that, directly or indirectly, control disease spread. These personnel can help track the biological agents back to their sources. They must work closely with their crisis management partners to determine the actual perpetrators in a biological incident.

Population-based public health care plans and implements actions aimed at disease prevention and health promotion that affect entire populations. Public health extends beyond medical treatment and traditional practitioner-patient (1:1) relationships by targeting underlying

risk factors.⁸ Population health offers a systematic way to study patterns of disease in communities and patterns of health care delivery to reduce morbidity (illness) and mortality (death). Population-based public health care focuses on the group (aggregate) or a community, not the individual.

The synergy between population health care and epidemiology creates public health practice. Public health practitioners come from all areas of health care: health education, nursing, medicine, nutrition, immunology, laboratory sciences, social work, and others. This practice is based on a distinct body of knowledge gathered, interpreted, and applied by teams of public health professionals. The doctrine and discipline of public health practice provides its leaders with a unique ability to respond to bioterrorism incidents.

ENDS (OBJECTIVES)

In Clausewitzian terms, the intrinsic nature of war on disease is absolute or total. A bioterrorism attack constitutes an act of force against an adversary for which there is no logical limit.⁹ Infectious disease is an enemy that offensively morphs and readily uses lethality without compunction to gain a strategic advantage. In response, public health personnel prepares to wage total war against infectious disease, as there can be no restraint against an enemy that increases its strength during every pause in the fight. This incredibly complex enemy can continually shift through genetic deception. In reality, though, the absolute warfare on disease becomes an “imperfect approximation”, most often stopping short of the extreme.¹⁰ The current issues concerning smallpox, a communicable disease thought to be eradicated on a worldwide basis, offers a frightening example of the limitations of absolute warfare on disease. As with all wars, friction detracts from warfighting efforts. Inadequate resources inhibit achievement of the absolute objective: the total global annihilation of infectious disease agents.

MEANS (RESOURCES)

Leavell and Clark's Levels of Prevention were introduced in the late 1940s to guide ways of thinking about health and public health care delivery: 1) primary prevention prohibits disease or injury before an occurrence and includes health promotion (e.g., vaccination or good nutrition); 2) secondary prevention catches something going awry at the earliest time possible and delivers prompt treatment to prevent permanent damage (e.g., tuberculosis screening or a maximal treadmill test); and 3) tertiary prevention limits disability and rehabilitation where the disease or injury has already occurred (e.g., cardiac rehabilitation or physical therapy after a stroke).¹¹ Primary prevention can be viewed as offensive strategy, while prevention in a tertiary mode can be seen as escalation of defensive strategy, often consisting of what Clausewitz

refers to as a “balance between waiting and parrying.”¹² Consistent with this strategy, health care operations are at their strongest, but often most desperate, in the defensive (tertiary prevention) mode (e.g., a patient fighting for life in the intensive care unit or ICU). Allocation of resources among the three prevention levels is invariably determined by the politics. But the nation’s current health care environment as well as bioterrorism response will only become stronger as the public health infrastructure increases its capabilities in its strong suit—primary prevention.

WAYS (CONCEPTS)

In epidemiology, the trinity of person (who), place (where), and time (when) are invaluable in tracking disease (i.e., enemy surveillance). Reliable intelligence enables public health leaders to quickly and accurately determine how much and how widely the infection has been spread.¹³ Person factors include age, sex, and race along with other demographic information. Place can be defined by natural or political boundaries, as well as by environmental factors. Time is usually considered on a monthly or annual basis; it can reveal critical disease trends and identify clusters when combined with the place factor. Person, place, and time dynamics serve to determine the culminating point of the attack—that point where capabilities are exhausted and there is no ability to continue offensive or defensive operations.¹⁴ Public health personnel must estimate the enemy’s superiority and take actions to accomplish the mission prior to the culminating point.

Infectious diseases possess several centers of gravity, to include infectivity, pathogenicity, virulence, resistance, and immunogenicity.¹⁵ Infectivity refers to the agent’s ability to invade and multiply in a host (e.g., the common cold is highly infectious). However, while all communicable diseases are infectious, not all infectious diseases are communicable. Communicability refers to person-to-person transmission, while infectivity denotes an agent’s ability to invade and multiply (e.g., anthrax, although infectious, is not communicable). Pathogenicity refers to the agent’s ability to produce clinical signs and symptoms of disease (e.g., in West Nile infections, most of the human cases are subclinical in nature and go undetected). Resistance refers to the viability of the agent to survive in adverse environmental conditions (e.g., HIV is an extremely fragile virus, but anthrax spores can “shelter in place” indefinitely). Virulence (lethality) refers to the agent’s ability to produce severe clinical manifestations (e.g., rabies almost always is fatal in humans once infectivity occurs). Immunogenicity refers to the agent’s ability to produce a specific immunity (e.g., humans who contract chickenpox have a lasting immunity against the disease in the future). In war, identifying the enemy’s most vulnerable attribute means locating

the enemy's center of gravity prior to approaching the culminating point. War culminates favorably when the enemy's center of gravity or will to fight is destroyed. Infectious diseases have their vulnerabilities; public health personnel can identify them and provide tactics for effectively attacking them.

The classic epidemiologic trinity of agent, host, and environment presents a lesson on epidemiologic patterns of disease and the factors that influence disease outcome (i.e., interplay between an infectious agent and the susceptible person occurring in a certain environment).¹⁶ Clausewitzian fog and friction complicate the epi triangle. Although the concepts of agent, host, and environment are simplistic, when they dynamically combine, the "simplest thing is difficult."¹⁷ This simple triangle, graphically depicted on the pages of any introductory epidemiology text, greatly perplexes post-doctoral public health professionals with years of battlefield experience. Factorial complexity in the triangle produces thousands of tripartite combinations that can occur in any given battle. Murphy's Law reigns as the supreme doctrine in many public health campaigns.

CURRENT CIVILIAN CAPACITY IN THE PUBLIC HEALTH SECTOR

Although protocols for response to bioterrorism and other public health emergencies may differ across the nation, all states rely on local public health agencies and officials to identify and respond to the incident.¹⁸ Unlike the release of a chemical agent, usually self-announcing within minutes (e.g., sarin) to hours (e.g., mustard agent) due to rapid emergence of symptoms, the signs and symptoms of biological agents as well as communicability may not appear until days (e.g., inhalational anthrax) or weeks (e.g., smallpox) of human-host incubation. It is commonly believed that a terrorist who disseminates a biological agent will release the disease in a covert or unannounced scenario, just as the envelopes containing anthrax appeared silently in the fall of 2001.

Compounding the silent release and incubation period is the time required for the health care system to determine something is amiss. One by one, patients could seek treatment for vague flu-like complaints, the hallmark symptom of most of the biological agents of choice. They would come through the normal portals of urgent care clinics and physicians' offices, and would do so in a wide geographic area given current American lifestyles (e.g., covert dissemination of an agent at a sports arena or in a plane). As the cases of unexplained or out-of-season illness increased beyond the normal threshold measured by the passive surveillance systems of public health, there would come a momentous sudden revelation followed by all hell breaking loose. Most interestingly, there would be no immediate *scene*—no place for traditional

first responders (e.g., EMS, fire fighters, and law enforcement) to roar into with flashing lights and wailing sirens in an effort to initiate HAZMAT decontamination activities. This scenario reveals why the public health system, to include a regional hospital and clinic response, is a nontraditional first responder in bioterrorism. Also obvious in this scenario is the recognition that a bioterrorism act is not a traditional HAZMAT event; it requires a different mode of response. Traditional first responders are not trained to process the sequence of incubation period and the infection process following exposure to a biological agent. Public health professionals are uniquely trained to play a crucial role on any response team investigating a suspected biological (e.g., anthrax) exposure.

CORE CAPACITY IN BIOTERRORISM PLANNING AND RESPONSE

A recent planning primer for local public health agencies published by the National Association of County and City Health Officials (NACCHO) describes critical elements for local planning for bioterrorism response.¹⁹ The primer explains how the core public health competencies of assessment, policy development, and assurance are integrated into the essential public health services. [Figure 1](#) displays the relationships among the core functions and essential services:

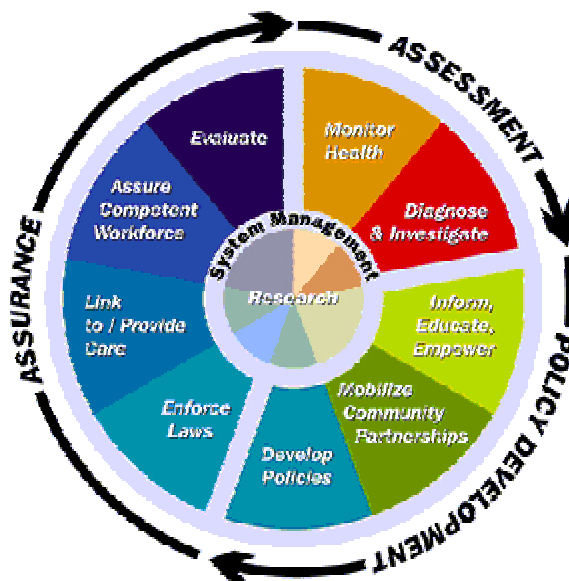


FIGURE 1: PUBLIC HEALTH CORE COMPETENCIES AND ESSENTIAL SERVICES²⁰

Public health bioterrorism response requires a rapid and steep climb in day-to-day operations within the public health system. In other words, a careful consideration of the core competencies and the essential service framework already embedded in public health play a big part in public health emergency planning for disease outbreaks. Early detection is essential for ensuring a prompt response to a biological attack. Enhancing existing surveillance systems and bolstering epidemiologic capacity will facilitate critical decisions. These capabilities along with the better planning, better emergency communication, more training for health care providers, practical education for the public, and increased lab capacity enable public health personnel to respond effectively to bioterrorism incidents.

CURRENT CAPACITY IN BIOTERRORISM PLANNING AND RESPONSE

In 1999, The Centers for Disease Control and Prevention (CDC) released the first round of monies (less than \$15 million) for bioterrorism specific planning and response through competitive cooperative agreements with state health departments.²¹ Eleven states and/or major cities shared the initial funding, and pilot programs were developed around focus areas of planning, epidemiology and surveillance, lab networks, and a health alert communications network. The goal was to bolster the public health system at both the state and local level.

In late 2001, CDC Program Announcement 99051 offered non-competitive cooperative agreements to all 50 states and the District of Columbia; the commonwealths of Puerto Rico and the Northern Marianas Islands; American Samoa; Guam; the U.S. Virgin Islands; the republics of Palau and the Marshall Islands; the Federated States of Micronesia; and the nation's three largest municipalities (New York, Chicago, and Los Angeles County)²² The expanded guidelines included planning and response for natural outbreaks of infectious disease and other public health threats and emergencies. Funding for 2002 was almost \$918 million. State and local health departments sharing an international border with Mexico or Canada were encouraged to use the funding for public health emergencies in border regions (traditionally defined as 100 kilometers on either side of the international boundary).

In June 2002, President Bush signed the Public Health Security and Bioterrorism Preparedness and Response Act, authorizing \$4.3 billion for bioterrorism preparedness, subject to congressional appropriation in 2003.²³ This is the all-time largest one-time investment in public health infrastructure ever—a 45 percent increase over 2002 levels.

State health departments, with their local partners, work within focus areas to insure bioterrorism planning and response capacity, and the interagency process at the local and state

level permeates all activities. The following focus areas indicate current capacity and specific activities within the public health system.²⁴

- **Preparedness Planning and Readiness Assessment:** Focus A establishes strategic leadership, direction, assessment, and coordination of activities to ensure statewide readiness, interagency collaboration, local and regional preparedness (both intrastate and interstate) for bioterrorism, outbreaks of infectious disease, and other public health emergencies. The National Pharmaceutical Stockpile (NPS) is a part of this focus area; it is designed to bolster state and local supplies in response to a biological and/or chemical terrorist attack or other catastrophic event. The NPS includes two components: 12-hour push packages and vendor-managed inventory (VMI) packages. Push packages are stored in secure and strategic locations across the United States and can be readily deployed to any region within 12 hours.
- **Surveillance and Epidemiology Capacity:** Focus B provides assistance to state and local health departments to enhance, design, and develop systems for rapid detection of unusual outbreaks of illness that may be the result of bioterrorism or naturally occurring infectious disease. Its goal is to establish expanded epidemiologic capacity in surveillance and investigation, with a concurrent increase in sophisticated information systems (e.g., Epi-X and GIS capability) to include after-hours notification, algorithms for automated identification of outbreaks/unusual events, person-based records, allocation of cases to health jurisdictions, and public key infrastructure (PKI) based security.
- **Laboratory Capacity – Biological Agents:** Focus C ensures availability of core diagnostic facilities for bioterrorism agents at all state and major city/county public health laboratories. These funds enable state or major city/county laboratories to develop the capacity to conduct rapid and accurate diagnostic and reference testing for select biologic agents likely to be used in a terrorist attack: *Variola major* (Smallpox), *Bacillus anthracis* (Anthrax), *Yersinia pestis* (Plague), *Clostridium botulinum* (Botulism from botulinum toxins), *Francisella tularensis* (Tularemia), and Filoviruses and Arenaviruses like *Ebola virus* and *Lassa virus* (Viral Hemorrhagic fevers). These “A List” agents were chosen because of their potential impact via illness and death; their ability to be widely disseminated; their potential for person-to-person transmission; their capability to arouse public fear and civil disturbance; and the capability to create special public health preparedness needs (e.g., stockpile requirements or enhanced surveillance/diagnostic needs).²⁵

- Laboratory Capacity—Chemical Agents: Focus D was included with 1999 funding, but supplemental funds were not available for chemical agent lab capacity in FY 2002.
- Health Alert Network (HAN) /Communications and Information Technology: Focus E helps state and local public health agencies establish and maintain a network that will support exchange of key information and training over the Internet by linking public health and private partners on a 24/7 basis. The HAN network also rapidly disseminates public health advisories to the news media and the public, and ensures secure electronic data exchange between response partners during public health emergencies.
- Communicating Health Risks and Health Information Dissemination: Focus F strengthens communication of risks by state and local public health organizations. Timely information must be provided to citizens during an attack, outbreak of infectious disease, or other public health threat or emergency. Training is provided for key public health spokespersons in communication skills (particularly those regarding infectious disease in times of crisis,) in the development of multi-lingual and culturally sensitive printed materials, in timely reporting of critical information, and in effective interaction with the media.
- Education and Training: Focus G calls for a training need assessment of key public health professionals, infectious disease specialists, emergency department personnel, and other healthcare providers to enable them to prepare for and respond to bioterrorism and other outbreaks of infectious disease. Once the assessment is completed, the public health system must ensure that the needed education and training is delivered through multiple channels, including academic institutions, healthcare profession organizations, and continuing education conferences.

GROWING CAPACITY IN BIOTERRORISM PLANNING AND RESPONSE FOR MASS CASUALTY

Bioterrorism planning doctrine calls for preparedness for mass casualties. Such preparedness is often mistakenly equated with hospital or hospital bed capacity. Further, mass casualties have traditionally been associated with acute trauma and natural disasters, not necessarily with public health emergencies related to bioterrorism events.

The number of victims in a mass casualty event disrupts the normal delivery of emergency and health care services. The concept of mass casualty care is not new to the healthcare system, but it has not been thoroughly tested and coordinated in the civilian sector. The association of mass casualty care with hospital capabilities probably began with a poor understanding of the National Disaster Medical System (NDMS). NDMS is a “cooperative

asset-sharing program among Federal government agencies, state and local governments, and the private businesses and civilian volunteers to ensure resources are available to provide medical services following a disaster that overwhelms the local health care resources.²⁶ It includes the Federal Coordinating Centers and disaster response teams (i.e., Disaster Medical Assistance Team [DMAT,] Disaster Mortuary Operation Team [DMORT,] Veterinary Medical A Team [VMAT,] and National Medical Response Team [NMRT specific for WMD response]). The system was originally designed to provide support for military and Veterans Health Administration hospitals in caring for wartime casualties evacuated back to the states. To date, fortunately, there have been no pervasive national mass casualties requiring a sustained NDMS response. While monumental NDMS team efforts in Oklahoma City (168 dead and 500 injured) and on 11 September (3000 dead and 6291 injured) are on record, the operations in Oklahoma never approached the 10,000 casualties that the Metropolitan Medical Response System (MMRS) demands in regional health care planning.²⁷ Even when the numbers did approach 10,000 on 11 September, mortuary services had access to only a few bodies, and human remains were excavated over a period of weeks and months. The World Trade Center casualty influx and nature of the injuries (i.e., many treat-and-release) were absorbed by the well-prepared local NYC hospital system well before full NDMS presence. Treatment at the Pentagon site was similarly addressed.

Dark Winter, a hallmark national exercise, was conducted in June 2001. It simulated a covert smallpox attack on the United States.²⁸ This senior-level exercise concentrated on raising the awareness of top-echelon decision-makers, to compel them to deliberately plan proactive responses. Even though reports after the exercise have been much touted by national planners and the media to reveal just how prepared the nation may or may not be for bioterrorism response, the exercise was essentially a tabletop scenario with an artificially induced top-down approach - - the kind of approach that neglects the realities of local response to disaster planning and coordinated, cohesive decisions. That is, while exercises like Dark Winter talk the language of mass casualty in tens of thousands, the tremendous amounts of resources needed to reality-walk such an undertaking at the local up through the state level are missing from current preparedness efforts. Also, these exercises seldom include use of the Incident Command System. The most common set-up for any bioterrorism exercise remains the tabletop approach: one table for government, one table for law enforcement, one table for traditional first responders, one table for healthcare, and so on. The civilian healthcare system (both public health and hospitals) can commit only minimal personnel resources (usually senior

supervisors) to a conference center for a day of “table talk”. These same systems can ill-afford to beleaguer already strained resources to accommodate any real time mass casualty exercise.

Recent Department of Defense (DOD) published guidance for a mass casualty care addresses biological terrorism incidents.²⁹ Regardless of how a mass casualties occur, lives are lost in mass casualty situations because resources are not mobilized efficiently. In fact, the lesser the resource levels, the more efficient the organization must be. While DOD guidance specifies components of a mass casualty response, command and control of the event is cursorily addressed in a paragraph that essentially states “someone or some agency needs to be in charge.”³⁰ ICS offers a way to address escalating day-day operations within the public health and health care system sector that will ensure the highest possible survival rate.

INCIDENT COMMAND SYSTEM (ICS)

The Federal Emergency Management Agency (FEMA) recognizes the Incident Command System (ICS) as the singular template for command, control, and coordination of resources and personnel during an emergency or disaster.³¹ The first comprehensive evaluation of ICS's twenty-five years use in California concluded that the system is so adaptable that ICS principles have been integrated into daily emergency response as well as non-emergency management operations of the California Department of Forestry and Fire Protection (CDF).³² In fact, CDF has continuously staffed a cell of on-call Major Incident Command Teams to respond to its most complex events since 1987.³³ This cell includes representatives from local government. When ICS operations become the daily norm, ICS practices become second nature for responders in all emergency response activities. Teams that get to practice together on an ongoing basis leverage individual personalities and capabilities.

Five of the ten barriers that the 1988 IOM *Future of Public Health* report revealed as impeding public health infrastructure can be directly addressed by adopting an ICS command and control approach in daily practices and operations: inadequate capacity related to scarce resources, disjointed decision making, ineffective leadership, organizational fragmentation, and problematic relationships across levels of government.³⁴ Although public health strategies for eliminating infectious disease were earlier compared to warfighting strategies, public health professionals are not educated as commanders or trained as soldiers. Most public health professionals possess an undergraduate degree in a health science field (e.g., nursing, health education, biology, sanitation); many go on to attain graduate degrees for public health practice (e.g., epidemiology, biostatistics, preventive medicine, community health nursing, microbiology, or general public health). These individuals are educated to think through complex public health

problems with exacting analytical skills, patiently tracking disease agents under the microscope, within the population, and around the globe. Public health is a truly an interdisciplinary practice; science, art, and politics all come into play on a daily basis. Team meetings for community consensus building, partnership, and collaboration are the favored modes of operation. Since public health professionals focus on lifestyle behaviors in primary prevention, their focus population is wooed through inclusion, reason, and group psycho-sociology. “Commanding” public health operations is a foreign concept, even if public health practitioners sometimes talk about the war on disease. In fact, ICS is sometimes introduced to public health workers as the Incident *Management* System, in order not to offend potential converts.³⁵

ICS BASICS AND BACKGROUND

The Incident Command System was developed by a group of California fire agencies following an after-action review of a devastating 1970 wildfire season. Responses to the wildfires revealed a blatant lack of concern for manmade jurisdictional boundaries, creating major operational issues. There was no clear organizational authority between departments, no predetermined rules for collective decision-making, and no coordination of even basic communications. The agencies’ collaborative effort to address these coordination problems was named Firefighting Resources of Southern California Organized for Potential Emergencies (FIREScope).³⁶

ICS provides command and control of a disaster event through common terminology, modular organization, consolidated incident action plans, a manageable span of control, unity of command, integrated communications, designated incident facilities, and comprehensive resource management.³⁷ Common terminology and integrated communications enable diverse players to work as a team. It overcomes language barriers and resolves real-time frequency and networking issues through a common communications plan, standard operating procedures, and a one-stop shop for media coverage. Modular organization allows for expansion and contraction of the ICS structure, with deployed components tailored to keep pace with the crisis phase. A manageable span of control is achieved through a 1:5 equation for direct supervision, although 1:3 to 1:7 ratios are authorized. Unity of command in ICS insures a unified effort to obtain every objective under one responsible commander; one person reports to only one other person, keeping information flow at a manageable level in crisis operations. A unified command “allows all agencies with responsibility for the incident, either geographic or functional, to manage an incident by establishing a common set of incident objectives and strategies.”³⁸ ICS’s unified command does not usurp an agency’s operational control, authority,

responsibility, or accountability. Instead, all agencies contribute to the command process through joint planning, integration of operations, and shared resources, as well as after-action assessments.

ICS organization (Figure 2) is built on five foundational components: command, planning, operations, logistics, and finance/administration. ICS is triggered through acknowledgement that the crisis transcends jurisdictional and functional boundaries. The operational level structures a coordinated approach using a prearranged system of principles that remain the same regardless of the type, geography, or jurisdictional control of an incident.³⁹

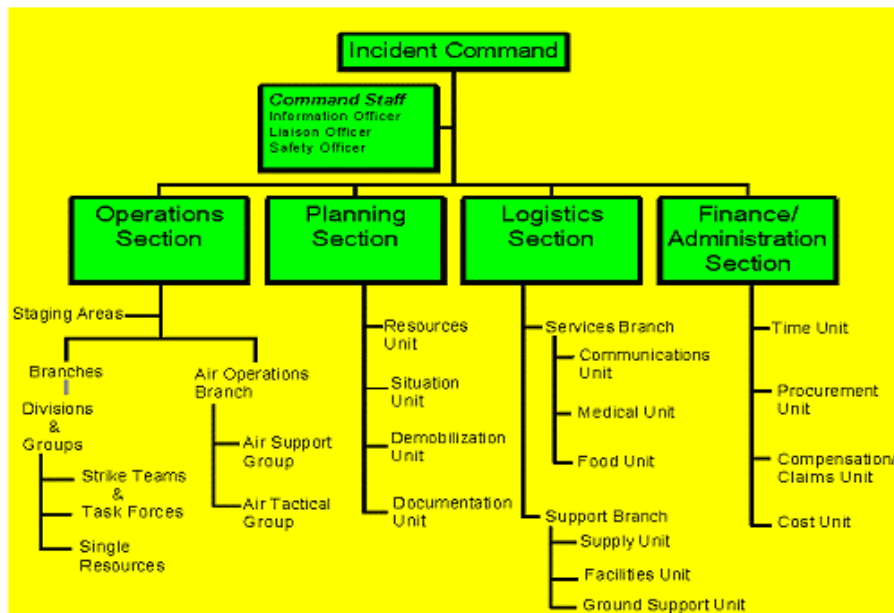


FIGURE 2: THE BASIC ICS STRUCTURE⁴⁰

Although ICS has the flexibility to expand and contract as needed, every incident must have an Incident Commander. The commander must have sufficient expertise to command the event. That commander then establishes command and control, controls personnel and equipment resources, maintains accountability for responder and public safety, and establishes and maintains liaison with outside agencies and organizations.⁴¹ The commander can delegate authority as the incident expands, to include command staff functions of a public information officer, a safety officer who is responsible for personnel safety, and a liaison officer who is the point of contact on-site for other agencies assigned to the incident and sustains a two-way flow of information.

The Planning Section completes the Incident Action Plan through a process of assessment and evaluation based on multiple information flows. Planning is the centerpiece of an effective ICS, beginning prior to the incident and continuing through the crisis. The planner closely coordinates with the commander to establish goals and objectives for command and control. The IAP specifies and sequences response activities and allocates required resources. The Planning Section is also responsible for the demobilization plan, the timeline for activities, and recording data and compiling reports during the crisis. The Operations Section is the activity hub of ICS; it executes the incident action plan (IAP) and assists the commander in tracking outcomes related to incident goals and objectives, while keeping the commander current on the situation and resource levels. The Logistics Section provides all the resources to resolve the crisis (e.g., personnel, facilities, vehicles, equipment, supplies). The Finance/Administration Section tracks costs and financial operations associated with the incident, facilitating reimbursement after the crisis.

Although separately defined for operational purposes, each of the ICS sections obviously works hand-in-glove with each other under the commander's direction. ICS demands pre-planning in every sector, both conceptually and organizationally. In addition, individuals assigned to key positions (e.g., a section chief) are ideally appointed two or three-deep; they share a functional knowledge of their duties prior to an incident. These section chiefs, in-turn, should be pre-assigning two or three-deep into the cells contained within their areas.

PUBLIC HEALTH'S ENTRY INTO ICS

In the operational arena, ICS is neither a perfected science nor an art. New users do not adopt it painlessly. In reality, non-traditional first responders for a bioterrorism incident (e.g., public health and hospitals) will not easily transition into the ICS world, especially since elements of ICS are already second nature for traditional first responders (e.g., fire or law enforcement).⁴² A cursory familiarization with ICS does not produce unified command and does not qualify anyone to lead joint operations.

When public health workers are introduced to ICS, they look at a graphic of boxed positions on a page that appears to be just another formal communication diagram and reporting chain. Even though leaders newly trained to ICS are warned that ICS is not a table of organization (TO), it is usually first perceived as a bureaucratic plug-and-play response to an emerging or full-blown crisis. "You get some people in the ICS, the first thing they start doing is they start filling bodies in all the boxes."⁴³ In fact, ICS may be perceived by new users as simply another tool in the box—something thrown in for good measure. ICS is *not* an add-on option for

response: rather, it is *the* foundation for command and control (C2) that can expedite operations to successfully protect and preserve human life. Further, adult learners must be fully convinced that the change in mindset to implement ICS is worth the time and energy they will invest.

Hospital systems across the nation have actually been more proactive in entering the ICS door than their public health partners. The Joint Commission on Accreditation of Healthcare Organization's (JCAHO) introduced new emergency management standards in January of 2001 that require an ICS-type function to organize operational readiness (i.e., a management plan that ensures effective response to emergencies and addresses mitigation, preparedness, response, and recovery phases of operations).⁴⁴ Hospitals' receptivity to ICS can also be attributed to the Hospital Emergency Incident Command System or HEICS. HEICS is a generic disaster plan released to hospitals in California in 1992, modeled after the FIRESCOPE system and initially tested in six hospitals in Orange County, California.⁴⁵ Given the JCAHO mandate and the HEICS model, many hospitals across the nation are incorporating the rudiments of ICS into internal operations and understanding how the hospital fits into the local disaster planning system. However, HEICS III is a *hospital-based* plan and is not integrated into unified command strategies across regions, or even across cities. In the event of a mass casualty, internalized ICS cannot meet the operational demands of a bioterrorism incident, a regional crisis that may rapidly assume national dimensions.

Although public health does not have a JCAHO-like oversight organization that defines standards, the core public health competencies of assessment, policy development, and assurance ([Figure 1](#)) have received much attention from recognized public health organizations and leading agencies. Core public health worker competencies for emergency preparedness and response include a working knowledge of a management system (i.e., the "incident command system or similar protocol") for emergency response.⁴⁶ Unlike HEICS III for hospitals, however, public health leaders have no universal or widely known model. Many public health providers (to include members in top leadership) talk a lot *about* ICS, but they have little formal training and an inadequate understanding of its operational applications, to include unification of health care resources.

Public health agencies seeking to build an integrated response across agency levels (e.g., state and local) and among health care partners (e.g., with hospitals and clinics) have been introduced to a plethora of options in an ICS that is supposedly singular in nature. NACCHO, a leading national organization for public health officials, has provided ICS workshops with a public health focus.⁴⁷ A group of Ohio leaders from a variety of state agencies is working on a

prototype for what is called an Integrated Command Structure, trying to incorporate unified command concepts into a single management model based on ICS. It is called the “Ohio Matrix Management Model.”⁴⁸ The Ohio Department of Health has developed a pilot public health ICS model, modeled from the hospitals’ HEICS III.⁴⁹ California and New York have legally mandated that all disciplines of local and state emergency agencies (to include public health agencies) will use ICS.⁵⁰ The diverse adaptation of ICS and its spin-offs in public health agencies and within health care threaten the viability of ICS. It obstructs common applications and distorts a powerful foundational model for unifying emergency response in the United States.

A PUBLIC HEALTH CASE STUDY IN ICS 101 – 2001 OHIO MENINGITIS OUTBREAK

On Sunday, 2 June 2001, the Ohio Department of Health’s Disaster Preparedness and Response Program received the first formal notification of a public health emergency, a meningitis outbreak, in Alliance, Ohio (located in the northeastern part of the state). This public health emergency actually involved three counties, five local health departments, and one hospital system. The following case study is based on a compilation of formal after-action reviews drawn up by the Ohio Emergency Management Agency, the Ohio Department of Health, the CDC Epidemic Intelligence Service (EIS) Officer, and personal logs.⁵¹ The chronology of events is displayed in [Table 1](#).

Date	Events during <i>Neisseria meningitidis</i> in Northeast Ohio, Spring 2001
26 May Saturday	First case reported to Local Health Department (LHD) and Ohio Department of Health (ODH)
28 May Monday	Second case reported to LHD, ODH Conference calls and decision to offer chemoprophylaxis to students and staff of West Branch High School
28-30 May	Antimicrobial chemoprophylaxis completed
31 May	ODH Lab reports first case as Serogroup C
1 June Friday	ODH Lab reports second case as Serogroup C
2 June Saturday	Potential third case recognized and reported to LHD, ODH Conference calls to discuss more wide-spread chemoprophylaxis and potential vaccination campaign CDC invited to participate on-site in formal EPI-AID

2-4 June	Deaths of first two cases occur Antimicrobial chemoprophylaxis completed
3 June Sunday	Meeting at Alliance Country Club (hospitals and LHD, ODH)
4 June Monday	Meeting at Alliance Community Hospital (hospitals, schools, government, PH) ODH Director's first press conference at Alliance Community Hospital
5 June Tuesday	Beginning of operations at Stark County Emergency Management Agency Report of potential third case specimen delay in arrival to CDC ODH Director makes decision to proceed with vaccination campaign ODH Director's second press conference with LHD health commissioners Initiation of Hotline
6 June Wed	CDC Lab reports third case (confirmed by latex agglutination and PCR) as Serogroup C
5-10 June	NE Ohio Meningitis Response Team activities and ICS utilization Daily conference calls and Hotline development (to include rumor control) Joint Public Information Center (JPIC) and coordination of media/press releases News advisory releases through the Health Alert Network (statewide) Organization of vaccination clinics Ongoing retrospective and prospective epidemiologic surveillance
8 June Friday	Vaccination campaign at 4 high schools for 6 school districts (approximately 4200 students in grades 9-12 and staff receive vaccine)
18 June	Third case, 18 year-old female, graduates with class at Marlinton High School
To Date	No further cases of meningococcal disease

TABLE 1: CHRONOLOGY OF EVENTS DURING NORTHEAST OHIO
MENINGITIS OUTBREAK (MAHONING, STARK, AND COLUMBIANA
COUNTIES) SPRING 2001

The meningitis outbreak was caused by the bacteria, *Neisseria meningitidis*, resulting in an infection that produces swelling of the spinal cord and brain. Every year almost 3000 people (most of them < 30 years) are diagnosed with meningococcal disease in the United States; about 300 (10%) die from the infection. Another ten percent experience severe disabilities (e.g., deafness, paralysis, limb loss). Most cases are sporadic, but when outbreaks do occur there is much fear and even panic in the affected communities. The infection can only be transmitted

through direct contact (e.g., saliva transfer by sharing of eating utensils or water bottles). Rifampin is the usual prophylactic (preventive) treatment; penicillin is the drug of choice for actual disease; and a vaccine protects against four serogroups (A, C, W-135, and Y). The vaccine is routinely given to military recruits and recommended for college freshmen.⁵²

Initial response to the incident occurred from the hospital level, with the infectious disease physician acting as the operation's leader. By the end of the weekend, local physicians and the hospital distributed 36,000 doses of prophylactic Rifampin to the public. The hospital was crowded with lines of people ringing the parking lot and demanding their medicine, a highly visible target for CNN vans drawn to the event. Published public health guidance calls for the prophylaxis of *only* intimate contacts (e.g., household or people who might have shared saliva) due to the potential of growing drug-resistant strains with inappropriate mass prophylaxis. The political will of the public demanded otherwise, and efforts to dissuade both the public and their private physicians from mass prophylaxis were unsuccessful at the local health department and hospital levels.

Public panic seemed to be a self-feeding issue, with nearby Sea World actually broadcasting an announcement on Saturday afternoon, 2 June, asking "All Alliance residents to leave the grounds."⁵³ Neighboring Pennsylvania residents indignantly called into Ohio's local health departments with stories of disease-carrying truck drivers who were contaminating the turnpike area. Newspaper articles showed church workers, (with plenty of time on their hands since services were cancelled,) washing all surfaces and toys with Clorox and "allowing the toys to air dry so as not to smear the bacteria." School systems closed and June graduations were cancelled. Environmental cleaning firms charged hundreds of dollars to "decontaminate" buildings and public areas with expensive germicides.⁵⁴

During the previous winter, over 100 staff members from the Ohio Department of Health participated in introductory training about ICS. It was not until late Monday afternoon, 4 June, that a regional ICS approach was first initiated. The local health departments had no formal training in ICS. The personnel sent from ODH varied as to their ICS expertise. After heated discussions with increasing pressure for a massive vaccination campaign (which would be initiated after confirmation of the third case's serogroup), ICS was up and running for the first time in state health department history. Many lessons were learned about ICS during this public health emergency. An after-action report by the state emergency management agency concluded: "Public health is not familiar with the use of ICS and it was apparent."⁵⁵ A consolidated AAR follows:⁵⁶

- ICS was “introduced” during an emergency situation. Responders cannot learn ICS during an emergency response. Even so many public health personnel believe that ICS is just another table of organization, not a command and control response tool. The health commissioners involved with the local health departments refused to appoint a single commander for unified operations; they maintained separate lines of authority throughout the incident.
- The hospital was not included in ICS operations as a full partner, and was left behind when public health finally stepped up to the plate. Complicating the situation was the lack of visible leadership of medical directors in the health department levels, to include persuasive public health communication and advice for a private physician community drowning in patient requests for prophylactic treatment.
- With no local commander consistently on-site, an ODH member gravitated toward the function, after first entering the event as the ICS Planning Chief.
- The Planning Section of ICS was never formally opened, and no integral incident action plan (IAP) was established. Without a published plan and without specification of goals and objectives, there was in fact no command function.
- Administrative/Fiscal support was initiated four days into the operation, with no data on-hand for critical earlier periods.
- The incident was initially addressed by a “groupthink” process; this did not change. Issues involving operations, planning, logistics, and administration/finance were group-tossed without command and control for final outcome--a morphing situation that meandered as priorities emerged to become compelling action needs. Daily conference calls with 15 to 20 leaders on-line lasted for up to an hour and a half while worker bee staff drove on to complete epidemiologic investigations and set-up vaccination clinics.
- The public hotline number was announced via a publicly televised format before the infrastructure was in place to handle the thousands of incoming calls, further escalating public frustration.
- Cell phones and pagers for critical communication with the leadership housed in the basement of the county jail (the site of a county emergency management agency and command post for the operation) would not function.

In retrospect, Ohio's public health performance certainly should not receive an ineptness citation during this initial attempt to implement ICS. In the final analysis, the Northeast Ohio Meningitis Response Team was successful: there were no more related cases of bacterial

meningitis within the population. Many individuals devoted much time and energy to accomplishing the mission, preventing further cases of bacterial meningitis and alleviating the public health crisis. The state health department continues to use ICS as an emergency response platform, most recently activating the ICS response in day-to-day planning for statewide smallpox vaccination of health care workers. The case study does, however, point out some of the pitfalls of relying on ICS in a non-traditional first responder setting without appropriate training and indoctrination. In addition, the public behavior associated with two deaths from communicable disease offers a chilling indication of what could occur during a mass casualty event.

ICS, a generic ICS that is understood by all personnel and *thoroughly* understood by its command staff, is critical to bioterrorism response. But how can a public health system, fixated on territorial control and slow, deliberate movements driven by perfected information, be convinced to make rapid but competent command decisions? How do public health leaders in a tidal wave scenario take the information at hand and take control of a situation involving thousands of lives?

PUTTING THE *COMMAND* IN THE INCIDENT COMMAND SYSTEM (ICS)

Although all disasters occur at the local level and demand a bottoms-up response, let there be no mistake about the nature of command: Command is a top-down approach that involves control and communications, and the commander is individually accountable. Although California's 1970's FIREScope deserves credit for the Incident Command System now directing emergency operations, a much older system of command serves as ICS's prototype—the command and control systems of military operations or C2. It is C2 that breathes life into the ICS organization for both the operations and the casualties.

Professional military education has a simple overriding objective: teaching officers to lead and ultimately to command. This training is offered at various times and different levels throughout an officer's career at the tactical, operational, and strategic levels. Command concepts fortify the military system and structures where officers work and lead. These officers share a common bond of understanding in operational art and command and control, guided by published doctrine.

Nationally, state-level interagency groups involved in homeland security have been tasked with developing a coordinated, comprehensive state strategy to address crisis and consequence management issues of terrorism. Like many other states, Ohio responded by appointing a committee with a direct report mechanism to Homeland Security Director Tom Ridge in

Washington, D.C. The question remains, though, about how to utilize the depth and breadth of knowledge and resourced residing in multiple agencies in order to launch a successful unified response. For example, although National Guard representatives participating in the state task forces understand C2, they have no formal training or background in ICS operations. Activated under Title 32 or Title 10, they follow a separate military chain of command. In the same task force, public health representatives have only a rudimentary understanding of ICS and little or no C2 ability, but they are grounded in the health aspects bioterrorism agent response expertise. Members of the fire service are on the same task force, with experience and training in both C2 and ICS, but minimal training in what makes a bioterrorism response different from a chemical or HAZMAT response.

So, what *does* an incident commander need to know, understand, and implement in the development of ICS expertise? What public health professionals need to gain to effectively control ICS is command expertise—an additional working knowledge of two basic doctrines found in the Army Joint Publication 3-0: Command and Control and Operational Art.⁵⁷ Furthermore, the current public health system must allow its leaders to take command in a public health emergency, necessitating a departure in current practices and cultural change. The next two sections lay out the basics for lessons in C2 and operational art for ICS public health commanders and command staff.

COMMAND AND CONTROL (C2)

“If I always appear prepared, it is because before entering on an undertaking, I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I should do in circumstances unexpected by others, it is thought and meditation.”

—Napoleon Bonaparte, 1812

An individual's influence on command can be profound, and the individual commanding ICS really does make a difference. A recent RAND publication points out that “the qualities of commanders and their ideas are more important to a general theory of command and control than are the technical and architectural qualities of their computers and communication systems.”⁵⁸ Command and control (C2), although drawing on elements of leadership, is not the same as leadership. Command is defined as the art of motivating and directing people and organizations into action to accomplish missions.⁵⁹ Command for a public health leader must incorporate visualization of the resources on hand (means) to meet the threat, while forecasting an end state and conceptualizing appropriate operations to make the end state happen (ways).

Elements involved in command include a clear and precise definition of the commander's intent and concept of operations, assignment of missions, designation of priorities, prioritization and allocation of resources, adjustment of decisions in a timely manner, initial tasking of subordinate units, commitment of reserves, critical information requirements, and constant monitoring of subordinate and senior command needs.⁶⁰ Control then refers to the ability to regulate forces and functions to execute the commander's intent.⁶¹ It enables the structure below to develop specific actions from general guidance; it is not detail-oriented. "The primary objective that the staff seeks to attain for the commander, and for subordinate commanders, is understanding or situational awareness—a prerequisite in order for commanders to anticipate opportunities and challenges."⁶²

Effective commanders promote a vision and intent that rises above reaction. Command and control cannot be based on dumps of indiscriminate information that push for command action. Instead, the commander tailors the communication and information intake to prevent immobilization from information overload or reactionary command decisions. There is simply no time in crisis situations for the public health commander to complete a cud-chewing analysis of numerous data sources; the information, by necessity, must be streamed up the chain and quickly married with the commander's intent and the higher authority's guidance. The control of information is prerequisite to maintaining C2. If the commander insists on processing lower level (e.g., the financial or logistics section) input/output and continually monitoring messages two and three levels down, then the commander is simply reacting to developments in the battle space versus anticipating them.⁶³

The skilled commander, after laying out the intent (or end-state) for an operation, is thereafter concerned with whether the command concept of operation is working towards successful mission completion. All other information, regardless of how operationally talented the commander was in previous roles, is static noise. The commander must have full confidence in the command staff and the chosen communication system." The design of the commander's intent is not to restrain but to empower subordinates by giving them freedom of action to accomplish a mission.⁶⁴ Although C2 is inherently concerned with organizational charts and wiring diagrams, a table of organization filled with the names of two and three-deep alternates guarantees nothing in itself. Command and control flourishes through a balanced arrangement of people, equipment, facilities, procedures, and communications that accomplish the mission. Command trust in subordinates is an intrinsic property in ICS.

In the military, a combatant commander is responsible for command authority over assigned forces and is directly responsible to the National Command Authority (NCA) for the

performance of assigned missions. At the state public health level, this responsibility is to the governor. In the scenario of consequence management involving bioterrorism, the public health agency would supply a functional combatant commander for the very specialized health forces needed in the ICS structure. Table 2 lays out the military concept for combatant commander job duties. While ICS commanders will certainly not convene a courts-martial, they do need to anticipate situations in which “relief for cause” is an option to address ongoing performance issues during a period of intense crisis.

<i>General Functions of a Combatant Commander</i>
1. Giving authoritative direction to subordinate commands and forces necessary to carry out missions assigned to the command, including authoritative direction over all aspects of military operations, joint training, and logistics.
2. Prescribing the chain of command to the commands and forces within command.
3. Organizing commands and forces within that command as necessary to carry out missions assigned to the command.
4. Employing forces within that command as necessary to carry out missions assigned to the command.
5. Assigning command functions to subordinate commanders.
6. Coordinating and approving those aspects of administration, support (including control of resources and equipment, internal organization, and training), and discipline necessary to carry out missions assigned to the command.
7. Exercising the authority with respect to selecting subordinate commanders, selecting combatant command staff, suspending subordinates, and convening courts-martial as delineated in title 10, US Code, section 164.

TABLE 2. GENERAL FUNCTIONS OF A COMBATANT COMMANDER⁶⁵

In the case of bioterrorism response, certain elements are fundamental to an ideal command and control concept:⁶⁶

- Timed deployment of resources which demonstrates adequate preparation and readiness to include tasking based on possible future developments in the battle space (e.g., joint law-enforcement/epidemiology teams, infectious disease triage teams outside ER facilities).

- Situational awareness to include key physical, geographical, and meteorological features of the battle space (e.g., epidemic spread within the epidemiologic triangle of person, place and time and planning/operational implications).
- Structuring of forces consistent with the battle tasks to be accomplished (e.g., quarantine's demand for enforcement assets outside the public health community and a common understanding of enforcement measure limits).
- Congruence of the plan concept with the means for conducting the battle (e.g., home treatment or a school gymnasium cohort treatment facility versus hospital placement of patients with communicable disease).
- A statement of what is to be accomplished, from the highest to the lowest levels of command (e.g., a simple and clearly articulated/written commander's intent and public health worker understanding of actions demanded by the next-highest level within ICS).
- Intelligence on what the disease is expected to do, including confirming and refuting signs for analysis throughout the engagement (e.g., applying information from a communicable disease manual such as Chin's *Communicable Diseases* and CDC updates).
- A real-time assessment of what the disease agent is actually accomplishing, not just what its capability or disposition is (e.g., a focused team-effort of both crisis and consequence management forces and mental health professional inclusion).
- Goals and objectives with alternative battle plans to include possible problems and opportunities that will figure into the fog and friction of battle.
- Indicators of the failure of or flaws in the command concept, along with ways of identifying and communicating information that could change or cancel the concept (e.g., red flag mechanisms as early warnings for immediate communication throughout the system).
- A contingency plan in the event of failure of the concept and the resulting operation.

Command and control will include joint operations during bioterrorism response. Unified or joint command is the next step in a crawl-walk-run ICS training scenario. Joint operations occur when different sectors of the battle force (e.g., crisis management and consequence management) respond with teamwork, unity of effort, synchronization, and integration of operations within time, space, and purpose that create synergy for mission success. Joint forces are "specifically designated, composed of significant elements, assigned or attached, of two or more military departments, and commanded by a Joint Force Commander with a joint

staff.”⁶⁷ Unity of effort is a priority, and Joint Force Commanders ensure that centralized planning and direction guide decentralized execution. In this way, all entities in the battle are used in a manner that synergizes their specific strengths and expertise.

OPERATIONAL ART

“War plans cover every aspect of a war, and weave them all into a single operation that must have a single, ultimate objective in which all particular aims are reconciled. No one starts a war, or rather, no one ought to do so without first being clear in his mind what he intends to achieve by that war and how he intends to conduct it.”

—Clausewitz, *On War*, 1832

Operational art is “the employment of military forces to attain strategic and/or operational objectives through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles.”⁶⁸ Operational art bridges the commander’s strategy and operational design, ultimately achieving in-synch tactical operations. Operational art integrates all levels of war, strategic, operational and tactical, as illustrated in [Figure 3](#).



FIGURE 3: LEVELS OF WAR⁶⁹

The commander relies on operational art to focus on the strategic implications of the engagement, and not the tactical details. The ICS public health commander must “stay out of the weeds.” However, tactical details may distract the commander, especially if the commander has considerable tactical expertise. As in the C2 area, a commander cannot do the operational work of subordinates or make hour-to-hour decisions in ICS areas of logistics, operations, planning, and administration/finance without skewing the command requirement to stay focused on the strategic or upper level of operational art in battle.

Many principles of war are woven into any application of operational art: objective, offensive, mass, economy of force, maneuver, unity of command, security, surprise, and simplicity.⁷⁰ Focus on the objective directs every operation toward a clearly defined, articulated, and attainable end (e.g., prevention of communicable disease from entering a third outbreak phase). The offensive enables forces to seize and exploit the initiative to gain the upper hand against the enemy (e.g., aggressive surveillance for new cases within a geographic region). Principles of mass and economy of force provide ways to prioritize efforts in order to achieve a decisive result without over-committing the resources on hand. Maneuver against the enemy is achieved when the commander provides flexibility within the delegated subcommands and operations that align with intent (e.g., an epi investigation team takes off on a new lead and expends existing but unallotted resources without an updated, direct authorization from the commander). Unity of command is complemented by a unity of effort, and security of the fighting forces is paramount to battle success (e.g., keeping healthcare workers out of harm’s way while uncovering and fighting the disease). Surprise and simplicity can be attained through use of the existing information on agents and knowledge of how the disease may operate within the affected population.

Elements of operational art along with a short description are listed in [Table 3](#). Operational art ultimately enable the commander to determine when the effort has met a successful conclusion, ensuring that the threat is not able to resurrect itself and the original crisis does not reoccur.⁷¹ In the case of bioterrorism, the ICS commander must ask one question from the beginning of the battle: “How do I know when it is over?” Relying on operational art will direct a sequential build and collapse of the ICS structure as the incident progresses and comes to the end.

Facets of Operational Art	Facet Description
Synergy	Integration and synchronization of all actions that create “more than the sum of the parts.”
Simultaneity and Depth	Simultaneous application of power against enemy strengths across tactical, operational, and strategic levels due to shared, common situational awareness.
Anticipation	Alertness for the unexpected combined with proactive abilities to exploit the situation.
Balance	Determination of an appropriate mix of forces and capabilities to match the nature and timing of operations.
Leverage	Ability to gain, maintain, and exploit advantages in combat power across all dimensions.
Timing and Tempo	Performance that is in tune to engagement phases and pace.
Operational Reach and Approach	Distance over which military power can mass effects and be employed decisively.
Forces and Functions	Design of campaign in a way that simultaneously defeats adversary forces and functions.
Arranging Operations	Phasing operations to deter/engage, seize initiative, employ decisive operations, and transition for redeployment.
Centers of Gravity	Characteristics, capabilities, or sources of power whereby a force derives freedom of action, physical strength, and the will to fight.
Direct versus Indirect	Confrontational versus non-confrontational action; depends on your personal assessment of strength versus the enemy's.
Decisive Points	Analyzed to determine the commander's objectives and lines of operations; concerned with Centers of Gravity.
Culmination	Arrival in a time and space where forces can no longer attack, counterattack, or defend (can be used as offensive or defensive application).
Termination	Knowing when to say when. Should be determined before forces are committed.

TABLE 3. FACETS OF OPERATIONAL ART⁷²

Another area of operational art involves campaign planning, which encompasses both the deliberate (i.e., pre-event) and crisis action (i.e., during an actual event) planning phases in a specified theater of operations.⁷³ A campaign plan describes how operations are connected in time, space, and purpose.⁷⁴ Although public health deliberately plans for bioterrorism response in state and local annexes of the all-hazards emergency management planning, the plans are not shaped in an ICS format or adequately detailed to define response relationships with other partners. Observance of ICS tenets and appropriate partnering could greatly enhance deliberate planning in the public health annex and significantly strengthen the crisis action planning phase. Local exercises using an annex based on ICS response would provide ICS practice and encourage partnering, as well as identify the operational seams that need ironed out. "Campaign planning is done in crisis or conflict, ... but the basis and framework for successful campaigns is laid by peacetime analysis, planning and exercises."⁷⁵

One word of caution is in order for deliberate planning in bioterrorism or other disaster response. There is a danger in planning at only the tactical level, or planning operationally before planning strategically. For example, the National Pharmaceutical Stockpile arrival pushed civilian bioterrorism planning during 2002–2003. This planning involves elements of where, when, who, how. The locals (e.g., an MMRS regional locale) cannot proceed with planning without state guidance because the call-in of the 12-hour push pack is ultimately controlled at the state level, usually by the governor's designation of the emergency management agency or state health department. Glitches are currently evident because the MMRS federal mandates call for NPS regional plans without the incorporation of state guidance. While these issues are being worked, the use of ICS on a statewide strategic planning level could have eliminated some the current angst. Even in deliberate planning, state health departments should step up to the strategic plate and incorporate C2 in operational art. In addition, there must be a coherent doctrine (policy) at the state level for action-oriented, unified ICS.

IMPLICATIONS OF OPERATIONAL ART AND ICS (BRINGING IT ALL TOGETHER)

Crisis is a time of extreme intensity. A mass casualty situation related to a bioterrorism incident will add unparalleled psychological stress to a genuine mix of madness. Even without a full-blown crisis, the usual problems that organizations have in sharing operational control are always intensified during ICS-based operations.⁷⁶ When the tasking structure of the system suddenly starts, there is no time for consensus building and drawn out decision-making. Then,

the incident commander and command staff (i.e., planning, operations, logistics, and administration/finance) must have an absolute comfort level with ICS.

The civilian health care system cannot be expected to respond within a system that they have not been thoroughly trained for, regardless of their consequence management expertise in health aspects of bioterrorism agents and infectious disease in the healthcare setting. Public health agencies, whether at a local or state level, have operational track records involving management, direction, and coordination—not *command*. The issue at hand is not *what* to do, but *how* to do it.

The foregoing analysis of the public health infrastructure’s current abilities to use the ICS structure in consequence management yields several cogent summary observations:

- Agency heads and top-level supervisors have no backgrounds in command and control, but do not fully understand that they lack the ability to apply ICS (i.e., they do not know what they do not know).
- ICS command by current public health leadership without appropriate training in C2 and operational art is destroying the integrity and credibility of ICS.
- Civilians may actively resist operations that are perceived to be military nature during pre-planning phases.
- National Guard members have little or no experience with ICS concepts, yet they partner with civilians for disaster response at the state and local level.
- Current ICS use by public health agencies is primarily as a wiring diagram or table of organization (e.g., the “team meeting” mentality continues).
- ICS is viewed as “just another way” to organize the public health agency or services for disaster response.
- Crucial parts of the functional ICS structure are being ignored when implemented and practiced (e.g., administration, planning).
- Public health is the functional combatant commander in bioterrorism response, but cannot partner with others in the health care system (e.g., hospitals, mental health, clinics, vets, private labs) until its own house is in order.
- Public health cannot participate in a Joint Command Structure (Unified Command System) until it becomes more adept in ICS platform applications, to include C2 and operational art.

RECOMMENDATIONS

BRIDGING THE SPAN OF CONTROL (CURRENT)

- **Insure that top leadership within public health agencies protect the consistent use of ICS platform and enable training for the public health workforce.** The integrity of ICS in interdisciplinary practice can only be maintained if the top leadership thoroughly understands its philosophy and doctrine. While it seems logical that the most qualified individual in an organization takes over ICS command on an event-by-event basis, the reality of the public health infrastructure, to include legal mandates and state code, demands that department leaders assume the role of ICS commander.
- **Use military concepts of command and control (C2) as well as operational art to train public health and hospital providers in ICS, creating cultural change in public health emergency response.** There is existing rationale for military training in C2 and operational art for providers in the public health system. These practitioners must develop a culturally diverse mindset for emergency response and mass casualty operations using ICS.
- **Place ICS training responsibility into one recognized national disciplinary organization for widespread dissemination.** C2 and operational art will be an easier sell if health professionals within the public health Infrastructure can affirm that their organizational leadership at the national level is informed about and accepting of a singular ICS approach. Both NACCHO (The National Association of County and City Health Officers) and JCAHO (The Joint Commission for the Accreditation of Health Care Organizations) could assume pronouncement for ICS training.
- **Bring the National Guard command structure and soldiers up to speed on ICS and its fit with military doctrines of C2 and operational art.** Because of their military background and familiarity with the concepts, National Guard members can quickly learn the ICS approach. There must, however, be some formal training to bring the top leadership and soldiers interfacing with civilian disaster planning committees to a working understanding of the ICS structures in place for consequence management. This training, of course, would also include soldiers participating in Homeland Security operations.
- **Build a coaching-mentorship of ICS commanders into exercise scenarios and routine planning activities based on ICS to develop command and control skills in a safe environment.** Even with formal training, public health commanders using ICS

will need on-the-job coaching in order to execute successful ICS operations. It is much easier to provide this coaching-mentorship in the confines of a safe environment such as an exercise or day-to-day planning, rather than during an actual crisis event. Individuals with combined public health knowledge, command and control concepts, and operational art will be able to coach an ICS commander and command staff. The coach, the commander, and the command staff must understand that a “thick skin” is pre-requisite during the skill building episodes.

BRIDGING THE SPAN OF CONTROL (FUTURE)

- **National adoption of ICS as the emergency management platform, with FEMA oversight within the Department of Homeland Security.** ICS adoption by state agencies and even statewide in some states is well on the way, but needs coordination by a single national entity. The integrity of ICS is at stake as new users adapt the system to address specific needs without cohesive oversight. ICS's ultimate goal is to shape a unified or joint response to an event involving diverse players; permutations of ICS could detract from this goal. National adoption and oversight of ICS would insure ICS viability across events and partners, making it the effective national system. The recent publication of HSPD-5 brings this recommendation one step closer to reality.⁷⁷
- **Creation of a multi-disciplinary national oversight board to provide ongoing policy guidance and direction for ICS.** Cole's study of ICS called for representatives from a full spectrum of disciplines to include fire service, law enforcement, health and medical services, public and private utilities, and the National Guard.⁷⁸ This board should include national representatives of the various disciplines involved. NACCHO and JCACHO could represent public health and hospitals, respectively, on the board. ICS must be expanded beyond the fire walls of traditional first response, to include recognition of new player-partners in WMD scenarios (i.e., bioterrorism).
- **Actively enable ICS as the national standard for emergency incident management through planning and policy direction.** WMD and disaster exercises must incorporate ICS response as an integral part of the scenario. Although grouped-table play may have served a purpose in start-ups for getting responders to think through situations, the time has come to formally unify ICS and go beyond the exchange of business cards at tabletops. The Guard could facilitate the adoption of ICS on a state-by-state basis to include helping civilians understand C2 concepts and operational art. Guard members already actively participating in many of the meetings and events involving disaster

planning. The Reserve Component could also assist in this endeavor after its role is clarified within the Homeland Security and Defense areas.

- **Accelerate FEMA coordination of ICS into national planning efforts through the State Emergency Management Agencies.** The mission of state emergency management provides them an excellent mode for transmitting ICS from the national to state level. When emergencies exceed the capacity of local governments, thus requiring assistance of the state and/or federal governments, state emergency management agencies facilitate coordination of resources to mitigate the damage and suffering in the shortest amount of time possible. State EMA already works closely with other state departments, as well as local counterparts.
- **Continue investigations into ICS as it becomes the institutional standard across the nation for emergency response.** This study emphasizes that ICS is neither a perfected art nor a science, but it already functions and is nationally recognized as a well-honed approach for emergency management. There will be much work ahead as other disciplines are folded into ICS practice. What improvements will be needed? How can new disciplines participate in ICS without destroying system integrity? How can cross-disciplinary training in ICS assist in unifying the response? Who is best suited to coach-mentor new ICS commanders in its application? How can ICS be rigorously evaluated on a national basis?

CONCLUSION

The United States Surgeon General, VADM Richard H. Carmona, recently declared the nation's health and nation's defense more closely intertwined than ever before: "The new threat that we face – weapons of mass destruction causing large numbers of civilian casualties -- means we now need to combine the disciplines of public health and the military."⁷⁹ What better way to affirm that partnership than by blending military concepts, specifically command and control and operational art, with ICS training for public health in a way that enables the infrastructure to quickly and decisively respond to a bioterrorist crisis?

The nation's public health infrastructure in this nation is already in place— pre-wired. State and local departments of health are receiving more resources than ever to bolster an early warning system of surveillance and epidemiological capacity, to include planning, exercise activities, and controlled access of the National Pharmaceutical Stockpile. Hours of education regarding the early recognition of infectious diseases related to bioterrorism agents have been provided to thousands of health care providers. The nationwide Health Alert Network is present

to promote communication and education within the provider community and between providers and the public in the event of a public health disaster, to include a bioterrorism attack. The public health infrastructure can and will respond with scientific expertise. It is going to take more than clinical knowledge, however, for a rapid, competent command of the situation. Public health emergencies will not be controlled by moving the disaster into scientifically controlled box and putting an ICS ribbon on the top.

Public health is a relative newcomer to the world of disaster response. The term “public health emergency” only recently surfaced in bioterrorism discussions. ICS is the best bet, if adequately trained and properly implemented as an operating platform, for public health to integrate into and lead a fully partnered response to an emergency that involves the deliberate release of a biological agent resulting in a mass casualty situation. Although ICS is not a perfected panacea, its most pressing issue could be its present success: “...the biggest problem confronting ICS at the dawn of the twenty-first century may be a ‘surfeit of success,’ which has resulted in so many adaptations and innovations that the system threatens to take on an unwieldy life of its own.”⁸⁰

In the end, public health needs to acquire two new capabilities to fully incorporate its expertise into the Incident Command System: the ability to operationalize command and control to take full advantage of ICS and a national template complete with a training mechanism to insure standardization of the ICS platform. The commander in a bioterrorism crisis could ultimately determine whether a public health emergency becomes a full-blown public health disaster.

WORD COUNT = 13,004

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